

# OFF-CENTER SOLDER BALL ATTACH ASSEMBLY

## CROSS-REFERENCE TO RELATED APPLICATIONS

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[0001] The present application is a divisional of U.S. Patent Application No. 09/652,537, filed August 31, 2000, <sup>now U.S. Patent 6,380,060</sup> which in turn claims benefit of United States Provisional Application Serial No. 60/187,824 filed March 8, 2000, the disclosures of which is hereby incorporated by reference herein.

## BACKGROUND OF THE INVENTION

[0002] The present invention relates to microelectronic connection components and more specifically relates to methods of attaching solder balls to conductive pads or terminals on a microelectronic element, such as a microelectronic connection component.

[0003] Soldered connections are typically used throughout the electronics industry to connect electronic components. Where the components to be connected include dielectric elements, such as a printed circuit board or a flexible dielectric sheet having conductive metal traces, the traces may be provided with enlarged regions, commonly referred to as "lands" or "conductive pads." A mass of solder may be deposited on each conductive pad by exposing the assembly to a liquid solder or, more typically, by applying solder preforms commonly referred to as "solder balls" onto the pads and heating the assembly to melt or reflow the solder balls. Solder balls are typically reflowed by raising the temperature of the solder balls above a predetermined temperature, generally referred to as the melting point of the solder balls. The melting point is defined as the temperature at which the solder balls transform from a first solid or frozen condition to a second molten or at least partially liquid condition.